

## REF: 02 DESIGN FEATURES

### FEATURE 1: THE GREENHOUSE



A glasshouse creates a new living or working area, in fact a space that will remove the dividing line between inside and outside, so that each environment is enriched by the awareness of the other.

It can extend your home on one or more levels, opening it up to light, sun and the surrounding landscape.

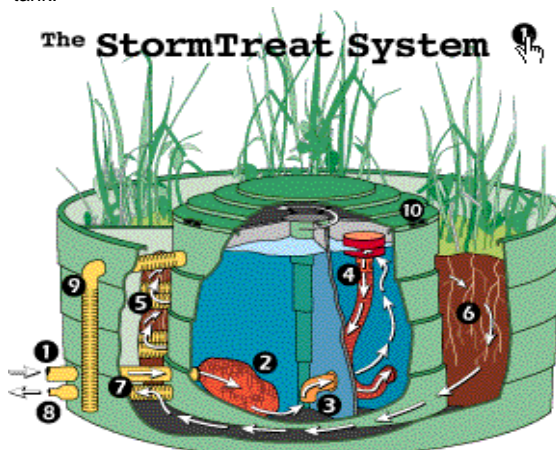
Imagine a conservatory design studio, or a greenhouse cum poolside lounge!

On top of all that come roof lights as atriums, combining natural light with a moderating micro-climate.

Thus, much contrary to popular belief, greenhouses do not serve just to provide the heating effect of the "greenhouse" effect and heat up the house interior (which is its primary technical function), but also to enhance one's lifestyle and replenish the soul.

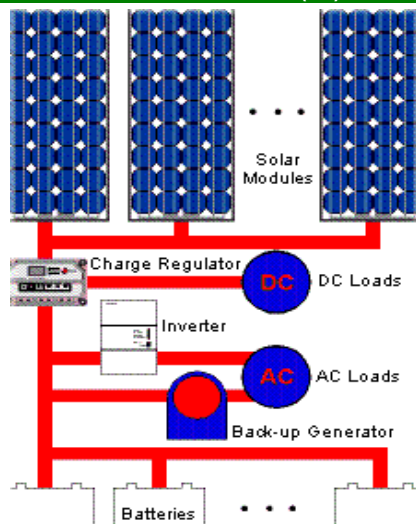
### FEATURE 2: RAINWATER COLLECTION AND TREATMENT

Surface water can easily be utilized in this EcoHouse design to reduce the domestic water consumption expenses. Being earth-sheltered, the water tank is protected from extremely low or high temperatures. The earth falls around the tank are profiled in such a way as to funnel the rainwater into the tank.



The collected water is then thoroughly treated for domestic consumption using the state-of-the-art StormTreat System™ produced by StormTreat Systems, Inc. Rainwater is treated by 100% biological means and is 100% safe for domestic use.

### FEATURE 3: PHOTOVOLTAIC (PV) CELLS



A photovoltaic (PV) device is designed to produce electricity as well as to enhance building architecture. A photovoltaic module is a power generating device that produces electricity when it is exposed to light. A module is composed of thin, solid-state PV cells that cover a relatively large surface in order to absorb maximum sunlight and produce a significant amount of energy. The module can be made in many shapes and many modules can be connected in strings to produce more power.

From the point of view of an architect, a PV module is a covering material comparable in cost to other construction materials. The reduction in utility costs can offset the extra costs of using PV modules as a construction material.

PV elements can be fabricated in different forms. They can be used on or integrated into roofs and facades as part of the outer building cladding, or they can be used as part of a window, skylight or shading device. PV laminates provide long-lasting weather protection. Their expected life span is in excess of 30 years. Warranties are currently available for a 20-year period.

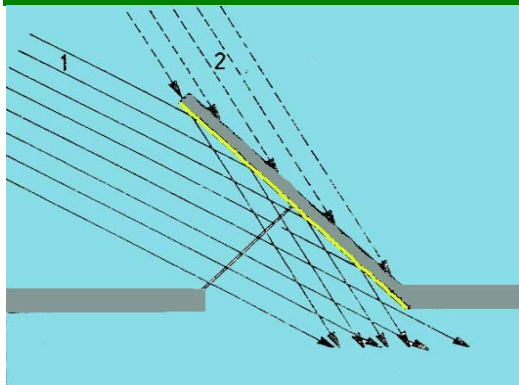
PV systems are modular in nature and can be adapted to changing situations. They can usually be added to, removed, and reused in other applications. Typical modules consist of glass laminates, plastic tedlar bounding material and silicon cells with trace amounts of boron and phosphorous. Their disposal or recycling after their life span should not create any environmental problems.

Facades occupy the majority of the surface area of the structural shell of the building. PV laminates provide the same architectural appearance as tinted glass. PV modules used as a facade can be tailor-made for size and shape, and they can be configured as a simple facade plate or as a multifunctional element for cold or warm facades.

PV modules can operate as sunshading devices or as windows within the outer skin of the building. The PV cell itself can be so thin that it is possible to see through it; a cell can provide a 20-50% filtered vision to the exterior or the cells. Alternatively, the laminate can be spaced so that partial lighting filters through the PV element and illuminates the room.

There are more than 3,000 successful building-integrated PV systems in Germany, Switzerland and The Netherlands. Japan has a program that will build 70,000 PV-integrated buildings. The USA is promoting a one-million PV roof program.

#### **FEATURE 4: REFLECTING/INSULATING SKYLIGHTS**



##### **LEGEND:**

- 1 Sunlight reflected into the building in the morning/afternoon or the winter season
- 2 Protection against excessive sunlight

The windcatches provided for natural cross-ventilation are provided with skylights to serve as additional natural lighting sources. The skylights should be directed to face your prevailing winds and/or natural light sources.

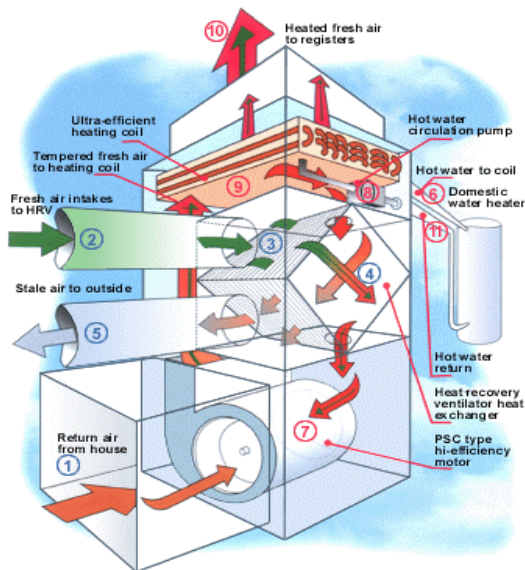
They are designed with an inner reflecting surface attached to an insulating board. The former reflects sunlight into the home, the latter prevents heat losses from inside to the outside.

#### **FEATURE 5: HVAC AND IAQ**

Even if you don't live in an ultra-efficient home, you have probably spent some time recently weather stripping doors and windows, caulking around frames, filling walls and attics with insulation. Yet our homes today are built to keep fresh air out. All in the name of energy efficiency. As a result, you've cut your heating and air conditioning costs. Excellent. But at the same time you have made it more difficult for fresh air to move into your home and for stale air to move out. The indoor air quality has deteriorated, and that makes the home environment uncomfortable and unhealthy.

The brilliant Lifebreath Clean Air Furnace®, manufactured by Nutech Brands Inc. uses a domestic water heater as its heat source. The efficient system creates a healthier, more comfortable home environment while lowering energy bills. This combination heating system results in higher efficiency ratings than are possible with conventional furnaces i.e. - lower fuel costs for you.

It offers a solution to protect the occupants from the pollutants in your eco-home while reducing heating and air conditioning costs and has a built-in Heat Recovery Ventilator (HRV) that replaces stale air with fresh.



The Lifebreath Furnace brings outdoor air through the built-in HRV, ensuring fresh, healthy heating of your home - all for the cost of a high efficiency furnace. Although your eco-home will not always require heating, the ventilation component of the HRV works year-round to provide a constant stream of fresh air to every room of your house.

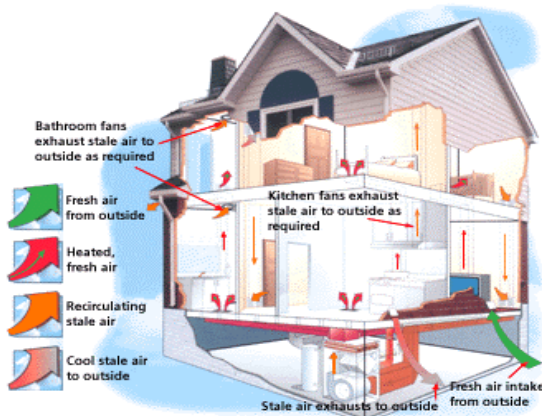
Lifebreath operates safely and quietly. Instead of the periodic bursts of hot air distributed by conventional furnaces, a steady stream of warm air is released throughout the house - reducing drafts, and creating a more even temperature distribution. The atmosphere in your EcoHouse will be noticeably improved.

This heating system provides constant ventilation and a steady stream of warm air for the healthiest, most comfortable home environment possible. This occurs with a system efficiency of up to 90%.

The Clean Air Furnace allows for the addition of a plenum-mounted air conditioner. As long as the furnace is controlled by a thermostat with a fan auto/on switch, users can select heating or cooling with ventilation to meet your climate control needs in every season.

#### LEGEND:

1. Warm, stale air from the home is returned to the Lifebreath Clean Air Furnace.
2. Outdoor air travels through the fresh air intake and is brought into the integral HRV
3. The fresh and stale air pass through opposite sides of the HRV's aluminium heat exchange core.
4. Heat from the stale air is transferred to the fresh air.
5. Stale air is exhausted outside.
6. Hot water is sent from the water heater to the furnace heating coil.
7. A PSC type high-efficiency fan blows the tempered fresh air from the HRV into the coil.
8. The circulation pump distributes hot water through the coil.
9. The circulating hot water heats the air to the desired temperature.
10. Warm, fresh air is distributed to registers throughout the EcoHouse.
11. The hot water travels through the coil and returns to the water heater for domestic use.



The compact Clean Air Furnace uses hot water as its heat source. Water is pumped from your home water heater to the furnace heating coil. A fan with a PSC high-efficiency motor blows the fresh air from the HRV into the heating coil where the circulating water warms the air. Water leaves the heater, travels through the hot water circulation pump, and returns to the water heater. As the water travels through the furnace's heating coil, air is warmed and sent to registers throughout the house.

The HRV removes stale, contaminated air from inside the EcoHouse to the outdoors. At the same time, it draws fresh, oxygen-laden air from outside and distributes it throughout the house. Polluted air is constantly being replaced by an equal quantity of fresh, clean air.

[Find EcoHouse-Plans \(Find ecological home plans at EcoHouse-Plans.com\)](http://EcoHouse-Plans.com)



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